

Trends of Infertility and Childlessness in India: Findings from NFHS Data

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Abstract

Etiology of infertility varies from region to region and from one population to another and even from one locality to another within the same population. Childlessness has serious demographic, social and health implications. Hence an attempt has been made to get some approximation about levels and patterns of infertility and childlessness in India by using National Family Health Survey-2 (1998-1999) and National Family Health Survey-3 (2005-2006) data. The study population consists of women aged 20-49 years married for ≥ 5 years. Age of women, age at first marriage, place of residence, standard of living, working status of women, and region are some of the variables related with the rate of infertility and childlessness. Infertility rate is high among women in urban areas. This may be due to lifestyle or a later age at first marriage. Considering religion, Muslims show the lowest infertility rate. Scheduled tribes have high infertility rate. With increasing levels of educational attainment among women, infertility rate increases. This can be related to the fact that with aspirations for attaining higher educational level, marriage is delayed as a result of which in confirmation with aforementioned causation factors (higher age at marriage, urban living style etc.), infertility rate is high among this sub group of population.

Keywords: Primary Infertility, Childlessness, Currently Married Women, National Family Health Survey, India.

Introduction

The reproductive system is subjected to the environment with its cultural, religious, political and socio-economic factors. Etiology of infertility varies from region to region and from one population to another and even from one locality to another within the same population. For a large part, involuntary infertility is related to conditions that are preventable in principle such as sexually transmitted diseases, infections and parasitic diseases, health care practices leading to iatrogenic pathology, exposure to toxic substances either in the diet or environment and complications suffered during post partum or post abortion period, particularly in case of an unsafely induced abortion.

Infertility is a worldwide problem affecting 8-12 percent couple (50-80 million) during their reproductive lives (WHO, 1991). In Sub-Saharan Africa,

the prevalence of infertility, ranged from less than 10 percent in Togo and Rwanda to about 25 percent in Cameroon and Central African Republic of women aged 20-44 years (Larsen, 2000). However, the single major cause of infertility in all probability is gonorrhoea through tubal infection and occlusion in women (Frank, 1983). A high level of infertility is associated with a high level of sexual mobility, premarital sex, divorce, extramarital sex and prostitution. From Demographic and Health Surveys 1994-2000, it was found that 3.3 percent in Mozambique and 1.3 percent in Kenya of currently married women had no fertile pregnancies in the age group 25-49 and among those women who had sex but no pregnancy are 4.6 percent in the former and 2.5 percent in the latter country (Rutstein and Shah, 2004).

Census of 1981 estimates infertility in India around 4-6 percent and according to NFHS-1 childlessness is around 2.4 percent of currently married

women over 40 years in India (cited in Jejeebhoy, 1998). Childlessness in India is estimated around 2.5 percent. It is around 5.5 percent for 30-49 age group and 5.2 percent for 45-49 age group. In absolute terms it is around 4.9 million and if secondary infertility is also added to it then the total number of infertile couples is around 17.9 million (Shivaraya and Halemani, 2007). Infertility has been relatively neglected as both a health problem and a subject for social science research in South Asia, as in the developing world more generally. The general thrust of both programmes and research has been on the correlates of high fertility and its regulation rather than understanding the context of infertility (Jejeebhoy, 1998).

Childlessness has serious demographic, social and health implications. The ease with which women can be labelled infertile or resist the label, the experiences of childless women and the process of seeking solutions for infertility all go beyond the biological fact of reproductive impairment (Unisa, 1999; Pearce, 1999). The conflux of personal, interpersonal, social, and religious expectations may bring a sense of failure, loss, and exclusion to those who are infertile. Relationships between couples can become very strained when children are not forthcoming. One partner may seek to blame the other as being defective or unwilling. Childless couples are sometimes excluded from taking leading roles in important family functions and events such as birthdays, christenings, confirmations, bar mitzvahs and weddings. Moreover, many religions assign important ceremonial tasks to the couple's children. Many societies are organized in such a way that children are necessary for care and maintenance of older parents. Even in developed countries with social support systems, children and family are expected to provide much of the care for the elderly (Rutstein and Shah, 2004). Living as an involuntarily childless woman is challenging for femininity and the female role. Norms may be difficult for those who prefer to live according to them, but they are even more difficult for those who have no choice (Sundby, 1999). Childlessness is of particular concern because of the global extent of the problem and the social stigma attached to it. Hence, an attempt has been made to understand the level and pattern of infertility and childlessness in India.

Data and methodology

National Family Health Survey-2 (1998-1999) and National Family Health Survey-3 (2005-2006) have been used for the analysis. NFHS-2 (1998-1999) data provides information on fertility, mortality, family planning and important aspects of nutrition,



Fig. 1. — Classification of states in India.

health and health care. The NFHS-2 survey covers a nationally representative sample of more than 90,000 ever-married women aged 15-49 years from 26 states that comprise more than 99 percent of India's population (IIPS, 2000). NFHS-3 collects information from a nationally representative sample of 109,041 households, 124,385 women of the age group 15-49 years of age and 74,369 men of the age group 15-54 years of age. The NFHS-3 sample covers 99 percent of India's population living in 29 states. It includes questions on several emerging issues such as perinatal mortality, male involvement in maternal health care, adolescent reproductive health, high risk of sexual behaviour, family life education, safe injections and knowledge about tuberculosis (IIPS, 2007). Individual files (women file) of both rounds of NFHS have been used for the present study.

For the present analysis currently married women of the age group 20-49 years married for more than 5 years have been selected. Age group below 20 years of age has been excluded so as not include the impact of adolescent sterility from the analysis. The classification of states in India is shown in Figure 1.

Statistical Analysis

Bivariate and multivariate analyses have been done. For multivariate analysis, binary logistic regression has been applied. This has been done as dependent variables are dichotomous. For example, to study the factors associated with primary infertility, categories of dependent variable has been formed as "1 = Yes (Primary infertility)" "0 = No". Similar categoriza-

Table 1: Primary infertility rate among currently married women aged 20-49 married for above 5 years, National Family Health Survey 1998-999 and 2005-2006

Background characteristics	NFHS-2		NFHS-3		Total women	Absolute change
	Percent	Total	women	Percent		
Age At First Marriage						
18 years and below	1.86	950	1.68	929	-0.18	-9.58
Above 18 years	2.54	357	2.35	435	-0.19	-7.54
Place Of Residence						
Urban	2.09	356	1.94	444	-0.15	-7.27
Rural	1.98	951	1.81	920	-0.17	-8.48
Religion						
Hindu	2.06	1103	1.86	1117	-0.21	-9.99
Muslim	1.61	129	1.75	168	0.14	8.64
Christian	1.95	31	2.03	33	0.08	4.03
Others	2.02	41	1.78	41	-0.25	-12.15
Caste						
Scheduled Caste	2.02	239	1.88	257	-0.15	-7.21
Scheduled Tribe	2.56	144	2.25	138	-0.31	-12.11
Others	1.95	919	1.81	940	-0.14	-7.13
Education						
No Education	2.16	801	1.81	691	-0.35	-16.04
Primary	1.62	180	1.75	198	0.13	8.02
Secondary	2.00	254	1.89	389	-0.11	-5.48
Higher	1.72	73	2.38	86	0.66	38.27
Mass Media Exposure						
None	2.05	572	1.79	363	-0.27	-13.04
Partial	1.98	596	1.84	780	-0.14	-7.26
Full	1.94	140	2.01	221	0.07	3.63
Standard Of Living Index						
Low	2.28	484	2.17	394	-0.11	-4.95
Medium	1.86	560	1.71	403	-0.15	-7.88
High	1.93	253	1.63	462	-0.30	-15.30
Currently Working						
No	1.86	735	1.74	766	-0.12	-6.70
Yes	2.23	572	2.02	596	-0.21	-9.39
Total	2.01	1308	1.85	1364	-0.16	-7.77

tion has been done for childlessness. The covariates used for multivariate analysis are age of women, age at first marriage, place of residence, religion, caste, education, mass media exposure, standard of living, current working status and regions. These variables are related to women as women are the unit of analysis for the present study. Exponential beta with significance level has been used to present the result of binary logistic regression. The former tells whether the attributes in a variable are more or less likely to be associated with the dependent variable compared with the reference category and the latter portrays the strength of association.

Definition and Measurement Problems

Studies of infertility are hampered by the fact that different definitions are being employed in epidemiological and demographic research. In English demographic terminology, primary infertility (also called as primary sterility) is defined as the inability

to bear any children, either due to the inability to conceive or the inability to carry a pregnancy to a live birth. In medical studies, however, infertility is usually defined only as the inability to conceive. In English demographic language, the term “infecundity” refers to the inability to conceive after several years of exposure to the risk of pregnancy. Inability to conceive within two years of exposure to pregnancy is the epidemiological definition recommended by the World Health Organization. Clinical studies often use a one-year period of exposure. It is common in demographic studies to use a period of five years (Rutstein and Shah, 2004). The terminologies used in the analysis are as follows:

Primary infertility

Women who are currently married for more than 5 years, currently not pregnant, having no terminated pregnancy, never used contraceptives and have zero total children ever born.

Childlessness

Women who are currently married for more than 5 years, currently not pregnant, having no terminated pregnancy, never used contraceptives and have no living children.

Profile of women in India

The profile mainly describes those women (20-49 years of age) in India who are currently married for more than 5 years, currently not pregnant, having no terminated pregnancy and never used contraceptives. Most of the women have age at first marriage below 18 years of age. Around 68% of women live in rural areas and 78% of them are Hindus, 16% are Muslims and 2% are Christians. Around 18% women belong to scheduled caste¹, 8% to scheduled tribe and remaining 74% to other castes. More than half of women have no education and have partial exposure to mass media i.e. exposure to newspaper, television, radio. Women belonging to low, medium and high standard of living are 27, 33 and 40% respectively. Around 67% women are not employed in any kind of work. Region wise distribution of women depicts that 25% women are from central and eastern regions; 21% from south, 14% from north, 11% from west and 4% from northeast.

Results

Infertility rate

In India, the rate of infertility has decreased by 7.7% from NFHS-2 to NFHS-3 (Table 1). It is around 2% in NFHS-2 and around 1.85% in NFHS-3. Infertility rate increases with increase in age at first marriage. In NFHS-3 it has increased from 1.68 to 2.35% among women whose age at first marriage was ≤ 18 years as compared to those whose age at first marriage is above 18 years respectively whereas in NFHS-2 it has increased from 1.86 to 2.54% respectively. Another point to be noted is that the infertility rate is higher among women in urban areas compared to women in rural areas in both rounds of NFHS respectively. In NFHS-2, infertility rate is higher among women belonging to Hindu religion and other religious groups comprising women of Sikh, Buddhist/ Neo Buddhist, Jain, Jew, Zoroastrian/ Parsi and no religion. Among Christians and Muslims, it is comparatively lower. However in NFHS-3, the infertility rate is high among Christians followed by Hindus, Others and Muslims. Among women belonging to different castes, those belonging to scheduled tribes have a higher infertility rate in both surveys i.e. 2.56 and 2.25% respectively,

compared to those belonging to scheduled caste and others category. Level of educational attainment among women however does not depict any pattern. In NFHS-2, infertility rate is 2.16, 1.62, 2.00, 1.72% among women with no, primary, secondary and higher education respectively whereas in NFHS-3 it is 1.81, 1.75, 1.89 and 2.38% respectively.

Mass media exposure has shown direct relation with infertility rate in NFHS-2 and indirect relation with NFHS-3. Women with none, partial or full exposure to mass media have 2.05, 1.98 and 1.94% infertility rate respectively in NFHS-2 whereas in NFHS-3, it is 1.79, 1.84 and 2.01% respectively. Women belonging to low standard of living have high infertility compared to women belonging to medium and high standard of living. It is 2.28, 1.86 and 1.93% respectively in NFHS-2 and 2.17, 1.71 and 1.63% respectively in NFHS-3. Working women have high infertility compared to non-working women. It is 2.23 and 1.86% respectively in former survey and 2.02 and 1.74% respectively in latter survey. Infertility rate is high in western and southern regions i.e. 2.30 and 2.09% in NFHS-2 and 2.01 and 2.48% in NFHS-3 respectively. Eastern and central regions too depict comparatively high infertility rate i.e. 2.12 and 1.97% in NFHS-2 and 1.65 and 1.67% in NFHS-3 respectively. In north and north east infertility rate is relatively lower.

It can be observed that infertility rate has declined between NFHS-2 and NFHS-3. The relative decline has been maximum among women belonging to eastern region, north eastern region, women with no education, high standard of living and those belonging to the central region. Increase in infertility rate has been observed (in descending order) among women with higher education, belonging to the southern region, Muslims, with primary education, Christians, having full mass media exposure.

Childlessness rate

Childlessness rate has decreased from 3.01 to 2.65% between NFHS-2 and NFHS-3 in India as a whole (Table 2). Like infertility rate, childlessness rate too increases with increase in age at first marriage. It is 2.83 and 3.65% in NFHS-2 among women with age at first marriage ≤ 18 years versus those whose age

¹ Scheduled Castes (SCs) and Scheduled Tribes (STs) are Indian population groupings that are explicitly recognized by the Constitution of India, previously called the "depressed classes" by the British. SCs/STs together comprise over 24% of India's population, with SC at over 16% and ST over 8% as per the 2001 Census.

Table 2: Childlessness rate among currently married women aged 20-49 married for above 5 years, National Family Health Survey 1998-999 and 2005-2006

Background characteristics	NFHS-2		NFHS-3		Total women	Absolute change
	Percent	Total	women	Percent		
18 years and below	2.83	1447	2.47	1361	-0.36	-12.84
Above 18 years	3.65	514	3.18	589	-0.48	-13.05
Place Of Residence						
Urban	3.03	516	2.62	596	-0.42	-13.73
Rural	3.00	1445	2.66	1354	-0.34	-11.35
Religion						
Hindu	3.09	1652	2.71	1625	-0.38	-12.41
Muslim	2.54	204	2.28	219	-0.27	-10.45
Christian	3.46	55	2.95	48	-0.51	-14.77
Others	2.37	48	2.39	55	0.01	0.62
Caste						
Scheduled Caste	3.07	362	2.64	361	-0.43	-13.95
Scheduled Tribe	4.09	230	3.61	218	-0.48	-11.76
Others	2.86	1346	2.56	1327	-0.30	-10.48
Education						
No Education	3.38	1252	2.71	1034	-0.66	-19.63
Primary	2.47	275	2.66	301	0.19	7.49
Secondary	2.59	329	2.52	521	-0.07	-2.70
Higher	2.50	106	2.61	94	0.11	4.42
Mass Media Exposure						
None	3.16	880	2.71	550	-0.45	-14.36
Partial	2.93	883	2.63	1113	-0.31	-10.45
Full	2.76	199	2.62	288	-0.14	-4.97
Standard Of Living Index						
Low	3.61	765	3.32	603	-0.29	-7.96
Medium	2.82	851	2.52	590	-0.31	-10.81
High	2.52	331	2.14	606	-0.38	-15.08
Currently Working						
No	2.78	1097	2.51	1110	-0.26	-9.41
Yes	3.37	864	2.85	838	-0.52	-15.52
Total	3.01	1962	2.65	1950	-0.36	-12.10

at first marriage is > 18 years respectively. In NFHS-3, it is 2.47 and 3.18% respectively. Place of residence does not depict any notable difference. Childlessness is high among Christians and Hindus followed by Muslims and those belonging to other categories. Accordingly it is 3.46, 3.09, 2.54 and 2.37% respectively in NFHS-2 and 2.95, 2.71, 2.28 and 2.39% respectively in NFHS-3. Scheduled tribes have a high childlessness rate. It is 4.09 and 3.61% in both rounds of NFHS respectively. Childlessness rate is 3.07 and 2.64% among scheduled castes respectively and 2.86 and 2.56% among others respectively. Women without education have a high childlessness rate but differences in childlessness rate among women with primary, secondary and higher levels of education are marginal.

Childlessness rate is high among women with no exposure to mass media. It is 3.16 and 2.71% in NFHS-2 and NFHS-3 respectively. Among women with partial exposure to mass media it is 2.93 and 2.63% respectively and those with full exposure to

mass media it is 2.76 and 2.62% respectively. Women belonging to low standard of living have high childlessness i.e. 3.61 and 3.32% respectively in both rounds of NFHS. Childlessness decreases with increase in standard of living. Working women have high childlessness compared to non-working women. In NFHS-2, childlessness is high in southern regions followed by eastern, central, western, north eastern and northern region. In NFHS-3, childlessness is high in southern regions followed by eastern, western, central, north eastern and northern region.

Childlessness rate has decreased over time. It has decreased mostly (in descending order) among women in eastern and central regions, women with no education, those belonging to western region, working women and those belonging to high standard of living. However, childlessness rate has increased among those women with primary and higher level of educational attainment, women belonging to southern region and those belonging to others category of religious group.

Infertility and childlessness curves in general show a declining pattern with increasing age.

Variables related to infertility

Primary infertility is significantly determined by age of women according to NFHS-2 (Table 3). Women in the group of 25-29 years of age through each successive five year age group till 45-49 years of age are less likely to be infertile compared to women in the age group 20-24. Moreover, women with age at first marriage ≤ 18 years are 86% more likely to be infertile compared to women whose age at first marriage is > 18 years. Women in rural areas are 18% less likely to be infertile compared to women in

urban areas. Muslims are 22% less likely to be infertile compared to Hindus. Scheduled tribes are 21% more likely to be infertile compared to scheduled castes. Education is another significant factor influencing infertility. Women with primary, secondary and higher education are 29, 26, and 52% less likely to be infertile compared to women with no education. Working women are 20% more likely to be infertile compared to non-working women. Compared to women in the north; women in centre, the east, the northeast, the west and the south are 39, 49, 5, 49 and 42% more likely to be infertile.

Age group is one of the most significant factors for infertility according to NFHS-3 (Table 3). Infertility decreases with increase in age of women.

Table 3: Factors determining infertility and childlessness among currently married women aged 20-49 married for above 5 years, National Family Health Survey 1998-999 and 2005-2006

Background Characteristics	Primary Infertility				Childlessness			
	NFHS-2		NFHS-3		NFHS-2		NFHS-3	
	Exp (β)	Significance level	Exp (β)	Significance level	Exp (β)	Significance level	Exp (β)	Significance level
Age Of Women								
20-24 [®]								
5-29	0.69	0.00	0.51	0.00	0.59	0.00	0.51	0.00
30-34	0.51	0.00	0.38	0.00	0.45	0.00	0.41	0.00
35-39	0.39	0.00	0.38	0.00	0.39	0.00	0.37	0.00
40-44	0.40	0.00	0.36	0.00	0.40	0.00	0.35	0.00
45-49	0.43	0.00	0.36	0.00	0.44	0.00	0.37	0.00
Age At First Marriage								
18 years and below [®]								
Above 18 years	1.86	0.00	1.81	0.00	1.87	0.00	1.81	0.00
Place Of Residence								
Urban [®]								
Rural	0.82	0.01	0.92	0.27	0.80	0.00	0.92	0.18
Religion								
Hindu [®]								
Muslim	0.78	0.01	1.03	0.77	0.83	0.02	0.87	0.09
Christian	0.90	0.60	0.66	0.07	1.05	0.73	0.78	0.16
Others	1.11	0.52	1.14	0.45	0.92	0.60	1.05	0.73
Caste								
Scheduled Caste [®]								
Scheduled Tribe	1.21	0.09	1.31	0.02	1.29	0.00	1.45	0.00
Others	1.05	0.52	1.02	0.80	1.05	0.48	1.09	0.18
Education								
No Education [®]								
Primary	0.71	0.00	0.96	0.69	0.68	0.00	1.01	0.94
Secondary	0.74	0.00	0.96	0.65	0.62	0.00	0.87	0.07
Higher	0.48	0.00	1.20	0.23	0.48	0.00	0.88	0.37
Mass Media Exposure								
None [®]								
Partial	1.05	0.48	1.06	0.44	1.10	0.09	1.10	0.15
Full	1.11	0.43	1.03	0.83	1.24	0.05	1.08	0.45
Standard Of Living Index								
Low [®]								
Medium	0.89	0.11	0.80	0.00	0.87	0.01	0.76	0.00
High	1.03	0.78	0.72	0.00	0.87	0.13	0.64	0.00
Currently Working								
No [®]								

[®]=Reference category; Dependent variable 1) Primary infertility=1, No=0; 2) Childlessness=1, No=0

Women with age at first marriage > 18 years are 81 % more likely to be infertile compared to women whose age at first marriage is ≤ 18 years. Christians are 34% less likely to be infertile compared to Hindus. Scheduled tribes are 31% more likely to be infertile compared to scheduled castes. Women belonging to medium and high standard of living are 20 and 28% less likely to be infertile compared to women in low standard of living. Working women are 23% more likely to be infertile compared to non-working women. Women belonging to western and southern regions are 30 and 75% more likely to be infertile compared to women in the north.

Variables related to childlessness

Age of women is again a significant factor whereby childlessness decreases with increase in age of women according to NFHS-2 (Table 3). Women with age at first marriage > 18 years are 87% more likely to be childless compared to women whose age at first marriage is ≤ 18 years. Women in rural areas are 20% less likely to be childless compared to women in urban areas. Muslims are 17% less likely to be childless as compared to Hindus. Scheduled tribes are 29% more likely to be childless compared to scheduled castes. Education also influences childlessness significantly. Women with primary, secondary and higher education are 32, 38, and 52% less likely to be childless compared to women with no education. Women with partial or full exposure to mass media are 10 and 24% respectively more likely to be childless as compared to women with no exposure to mass media. Women belonging to medium standard of living are 13% less likely to be childless. Working women are 17% more likely to be childless compared to non-working women. Compared to women in the north, women in the central, the east, the northeast, the west and the south are 33, 46, 5, 31 and 47% more likely to be childless.

Childlessness is affected by age of women where, as age increases childlessness decreases according to NFHS-3 (Table 3). Women with age at first marriage > 18 years are 81% more likely to be childless compared to women whose age at first marriage is ≤ 18 years. Muslims are 13% less likely to be childless as compared to Hindus. Scheduled tribes are 45% more likely to be childless compared to scheduled castes. Women with secondary education are 13% less likely to be childless as compared to women with no education. Women belonging to medium and high standard of living are 24 and 36% less likely to be childless. Working women are 13% more likely to be childless compared to non-working women. Women in the central and the southern region are 18 and 63% respectively more likely to

be childless compared to women in the northern region.

Discussion

Conceptualizing infertility and childlessness from a data based on no direct question about infertility and childlessness is quite complex. However, an attempt has been made to define these two terms separately instead of using them synonymously as has been done in some of the literature. The control variables as has been described above have been selected to get some approximation about levels and patterns of infertility and childlessness in India by using NFHS-2 (1998-1999) and NFHS-3 (2005-2006) data. The study population is currently married women aged 20-49 years married for > 5 years. The age group 15-19 years has been removed deliberately from the analysis so that the phenomenon of adolescent sterility does not dilute the findings for the study. Among this study population, infertility rate and childlessness rate have been calculated. Interestingly, infertility rate among those whose age at first marriage is > 18 years is high compared to women whose age at first marriage is ≤ 18 years. The infertility rate shows a positive relation with age at first marriage. From this it can be concluded that with increase in age at first marriage, the capacity for women to bear children also decreases.

Infertility rate is high among women in urban areas. This may be due to lifestyle or a later age at first marriage. Considering religion, Muslims show the lowest infertility rate. Scheduled tribes have high infertility rate. With increasing levels of educational attainment among women, infertility rate increases. This can be related to the fact that with aspirations for attaining higher educational level, marriage is delayed as a result of which in confirmation with aforementioned causation factors (higher age at marriage, urban living style etc.), infertility rate is high among this sub group of population. Standard of living has inverse relation with infertility rate. Working women have high infertility rate.

Childlessness which is defined as women who are currently married for more than 5 years, currently not pregnant, having no terminated pregnancy, never used contraceptives and have no living children portrays similar levels and patterns to that of infertility. However, not much explanation can be given about high infertility or childlessness rate among women with higher education or women belonging to low standard of living and likewise. Moreover, NFHS is not based on direct question on infertility or childlessness which poses a major drawback in explaining infertility and childlessness in proper context.

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